

Office of Civilian Radioactive Waste Management



Civilian Radioactive Waste Management System Requirements Document

***Revision 05
DCN 04***

(A00000000-00811-1708-00003)

June 4, 2001

***U. S. Department of Energy
Office of Civilian Radioactive Waste Management***

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Washington, DC 20585**

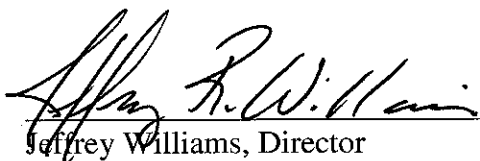
Civilian Radioactive Waste Management System Requirements Document

Revision 5 DCN 04

June 4, 2001

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Office of Civilian Radioactive Waste Management
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Having determined completion of technical review under procedure AP-6.28Q and compliance with requirements in accordance with the Program Change Control procedure AP-PMC-007, the change to the baseline document is approved for release.



Jeffrey Williams, Director
Systems Engineering and International Division

6/13/01
Date

**OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM
BASELINE CHANGE CONTROL BOARD
REVISION/CHANGE RECORD**

Document Number: DOE/RW-0406/A00000000-00811-1708-0003

Document Title: Civilian Radioactive Waste Management System Requirements Document

Rev/DCN Number & Date	BCP Number	Revision/Change Description	Pages Affected
Rev. 05, DCN 01 May 2000	BCP-00-99-0004 BCP-00-99-0006 BCP-00-99-0007 B-00-2000-0004	Incorporates requirements to comply with Interim Regulatory Guidance, solar power requirement, repository closure as early as 30 years after emplacement of the last waste package, and repository thermal constraints. Adds definitions of terms used in new requirements.	9, 14, 14a, 14b, B-3, B-8, B-9, B-10, B-11
Rev. 05, DCN 02 December 2000	B-00-2000-0009	Updates inventory of nuclear materials and incorporates it as design basis for SR in a new requirement 3.2.1.H. Modifies MGR requirement 3.4.A accordingly. Removes planning considerations 2.4.C and 2.4.D. Also revises/ expands a footnote to Table 1 under requirement 3.2.1.B to recognize that NNPP has requested increased ramp-up receipt rates for naval SNF.	5, 6, 10, 12, 13, 14, 14a
Rev. 05, DCN 03D March 2001	N/A	Adds a footnote to Table 1 under requirement 3.2.1.B to clarify: "The rates in this schedule are targets only and do not create any binding legal obligation on the Department of Energy."	10
Rev. 05, DCN 04 June 2001	B-00-2001-0001	Modifies requirement 3.4.C to incorporate the flexible design concept as established by Baseline Change Proposal (BCP)B-00-2001-0001, <i>Update Technical Requirements in the Program, Project and Contractor Baselines to Support the Flexible Operating Concept</i> . Clarifies requirement 3.2.1.B to differentiate design flexibility from operational flexibility.	10, 14, 14a

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3.2 OVERALL SYSTEM - LEVEL REQUIREMENTS

3.2.1 Overall System Performance

- A. The CRWMS shall be designed to dispose of commercial SNF, DOE SNF, vitrified DHLW, vitrified CHLW and IPWF, in accordance with the NWP and implementing regulations.
- B. The CRWMS shall be designed to be capable of accepting, transporting, emplacing, and isolating SNF and HLW at the annual rates specified in Table 1.

Table 1. CRWMS Receipt Rates ^{1,2,3} (In MTHM or Equivalent/Year (nominal))

Year	Commercial SNF	Government-managed Nuclear Materials
	Received Annually at Repository	Received Annually at Repository
2010	400	naval SNF - 1 DPC IPWF - 60 canisters TBD 1
2011	600	naval SNF -1 DPC IPWF - 60 canisters TBD 1
2012	1,200	naval SNF -3 DPC IPWF - 60 canisters TBD 1
2013	2,000	naval SNF -6 DPC IPWF - 60 canisters TBD 1
2014	3,000	naval SNF -8 DPC IPWF - 60 canisters TBD 1

¹ The actual operational load is a function of the numbers, types and sizes of casks and canisters in which the SNF and HLW are accepted from the points of origin. Since these specific numbers will not be determined until Purchaser/Producer/Custodian agreements are reached and schedules are established, the required rates are estimated in terms of desired systems-level MTHM acceptance rates.

² The receipt schedule of Government-managed nuclear materials will be provided by EM and NNPP, in accordance with memoranda of agreement, 5 years prior to acceptance. For planning purposes in order to satisfy National non-proliferation policies for surplus weapons plutonium disposition and to provide for acceptance of naval SNF among the earliest shipments to the repository, receipt quantities are established as RW priority for acceptance between 2010 through 2014. NNPP has requested an increase in the receipts of naval SNF in the first 5 years to 3, 3, 6, 6, and 12 DPCs. Upon formal submission of the revised EM/NNPP Integrated Acceptance Schedule, RW documentation will be updated.

³ The rates in this schedule are targets only and do not create any binding legal obligation on the Department of Energy.

4. Safeguards and Security Information - Nuclear Material Transaction reports (DOE/NRC Form 741), Nuclear Material Balance reports (DOE/NRC Form 742), and other information specifically agreed to (e.g. verification forms).
- F. CRWMS Waste Acceptance and Transportation Element shall process the above information in such a manner, including automated and manual data processing, to ensure availability to meet schedules.
- G. Information system security shall be provided to a level commensurate with the classification of the material being processed including physical security for data processing and record storage facilities, and restrictions on access to information.
- H. CRWMS Waste Acceptance and Transportation Element shall perform records management, including classification, receipt, storage, information retrieval and dispositioning of records identified in E above.
- I. Waste Acceptance and Transportation Element shall accomplish planning and scheduling according to the provisions of the Standard Contract (10 CFR Part 961) and the EM/RW and NNPP/RW MOAs.
- J. Integrated plans for CRWMS activities shall be developed and updated as needed to respond to changed data and operating conditions. Planning involves allocating system capacity, evaluating schedule requests, and establishing the CRWMS operations schedule.
- K. Records validation shall be initiated upon receipt of Purchaser/Producer/Custodian forms describing the SNF/HLW to be delivered.
- L. Waste Acceptance and Transportation shall validate title and/or transfer of responsibility and custody documentation from the Purchasers/Producers/Custodians.

3.4 ELEMENT REQUIREMENTS

This section contains the requirements allocated to the MGR Element.

- A. The MGR shall be designed to be capable of accommodating emplacement of the inventory of SNF and HLW specified in requirement 3.2.1.H. However, until the second repository is in operation, the MGR emplacement shall be limited to 70,000 MTHM or equivalent of SNF and HLW.
- B. Reserved.
- C. The proposed monitored geologic repository concept shall be capable of operating over a range of thermal conditions. For the high-temperature end of the range, the MGR design shall allow closure as early as 30 years after the last waste package is

- emplaced. For the full range of operating conditions, the MGR design shall allow the repository to remain open for up to 300 years after final emplacement, with appropriate monitoring and maintenance.
- D. The MGR shall provide a solar power component to the repository power grid that supplies power to the subsurface emplacement ventilation system. The solar component shall be capable of supplying a nominal 3 MW capacity during peak daylight hours, with an initial capability of at least 500 kW available one year prior to the start of emplacement of waste. The design of the solar component shall not preclude future modular-type expansion of capability if necessary.
 - E. Uncertainty in the postclosure effects of elevated rock temperatures on the near field environment shall be mitigated in the design and operation of the MGR by controlling (or limiting) the induced thermal environments. Following repository closure, long-term accumulation of water in the rock above the emplacement drifts shall be avoided by controlling the rock temperatures so that there is free drainage between the emplacement drifts.
 - F. All commercial spent nuclear fuel waste forms containing zirconium-alloy cladding shall be maintained at temperatures that will not accelerate the degradation of the cladding to the point that it affects the performance of the system.

3.5 CISF ELEMENT REQUIREMENTS

If a CISF is approved, the following allocated requirements shall be met.

- A. The CISF shall be designed to expedite operations by using a phased approach with Phase 1 having the capability to receive and store licensed dual purpose and multi-purpose systems only and Phase 2 having the capability to receive and store SNF in licensed dual purpose and multi-purpose systems and as individual assemblies at the rates indicated in Table 3.